

## ***Blechnum* × *rodriguezii* Hyb. Nov., a Deer Fern Hybrid from Southern Chile**

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**ABSTRACT.**—A new deer fern hybrid, *B. corralense* × *B. mochaenum* subsp. *mochaenum*, is described on the basis of macro- and micromorphological characters. Previous reports of this hybrid combination are excluded. In addition, new data on the distribution of *B. corralense* are reported, including its presence in Argentina.

**KEY WORDS.**—*Blechnum*, Chile, fern, hybrid, morphology

*Blechnum* L. (deer ferns) is one of Chile's most speciose fern genera. Thirteen species were recognized in this territory by Rodríguez (1995). Maximum species richness is reached in southern mainland Chile (Maule to Magallanes regions) and in the Juan Fernández Archipelago. Morphology is likewise very diverse, ranging from the smallest species in the genus, *B. corralense* Espinosa, to subarborescent forms, such as *B. cycadifolium* (Colla) Sturm, and including species with monomorphic, dimorphic and even trimorphic fronds. The different species of *Blechnum* have been tentatively classified into subgeneric groups (Tryon and Tryon, 1982), but their evolutionary relations remain poorly understood. It is not known whether hybridization and reticulate evolution, so widespread in homosporous ferns (see e.g. Grant, 1981; Barrington *et al.*, 1989; Haufler, 2002), play an important role in Chilean deer ferns.

*Blechnum corralense* × *B. mochaenum* subsp. *mochaenum* is the only hybrid combination reported to date among the Chilean deer ferns (Villagrán *et al.*, 1986; Rodríguez, 1995); though as detailed below we consider that this report was probably erroneous. *Blechnum mochaenum* G. Kunkel comprises three subspecies according to Rolleri and Prada (2006): subsp. *mochaenum* (southern Chile and southern Argentina), subsp. *achalense* (Hieron.) Prada & Rolleri (central and northwestern Argentina), and subsp. *squamipes* (Hieron.) Prada & Rolleri (central and northwestern Argentina and southern Brazil). *Blechnum corralense* was until now known only from the Chilean region of Los Lagos (Rodríguez, 1995), where it frequently co-occurs with *B. mochaenum* subsp. *mochaenum*. According to the most recent revisions of the Chilean



TABLE 1. Morphological characters of *Blechnum corralense*, *B. mochaenum* subsp. *mochaenum* and the new hybrid. The intervals cover mean values for 5 individuals in each taxon.

Character	<i>B. corralense</i>	<i>B. ×rodriguezii</i>	<i>B. mochaenum</i>
Lamina texture	herbaceous	intermediate	coriaceous
Aphlebia	present	present	present
Sterile frond length (cm)	4–11	5–10	12–30
Fertile frond length (cm)	11–20	8–20	13–36
Number of pinna pairs per sterile frond	7–16	12–17	14–27
Number of main veins per sterile pinna	5–11	8–10	13–29
Length of the petiole paleae (mm)	2–5	2–3	6–11
Length/width ratio of the petiole paleae	2–4	2–3	5–9
Guard cell length (µm)	71–80	60–76	58–69
Exospore length (µm)	37–42	misshapen	32–35

deer ferns (Rodríguez, 1995; Rolleri and Prada, 2006), the main characters for distinguishing these two taxa are lamina texture and number of veins of sterile pinna. We have identified some other diagnostic characters, as shown in Table 1. On the basis of a study of material in the Chilean herbaria CONC and SGO, and our own collections, we have concluded that *B. corralense* is also present in the regions of La Araucanía (*Amigo, Pajarón, Pangua & Quintanilla LGQ541*, SANT) and Aysén (*Landrum 8179*, CONC, and *Amigo CL2324*, SANT). In addition, two specimens collected by José Diem in the Nahuel Huapi National Park, Neuquén Province, Argentina (*Diem 50a, 50b*; CONC) turned out to be *B. corralense*.

We have also revised the putative hybrids between *B. corralense* and *B. mochaenum* subsp. *mochaenum* collected by Carolina Villagrán and co-workers in the Los Lagos region (Villagrán *et al.*, 1986), totaling six specimens (*Meza & Aguila 6510, Villagrán 6329, Villagrán & Aguila 5937, Villagrán & Leiva 7325, 7452*, and *Villagrán, Aguila & Leiva 7021*; CONC). Two of these specimens (7325 and 7021) lack fertile fronds, so it was not possible to determine whether they are hybrids. The other four specimens have well-formed spores indicating that they are not hybrids (though see Mayer and Mesler, 1993), and almost all characters suggest that these specimens are *B. mochaenum* subsp. *mochaenum*. However, two of these specimens (6510 and 7452) have exceptionally large spores (mean exospore lengths > 40 µm), and thus merit further study.

We have found the hybrid *B. corralense* × *B. mochaenum* at various locations in the Los Lagos region. In addition to abortive spores, this hybrid is distinguished by various characters that support its origin from a cross between *B. corralense* and *B. mochaenum* subsp. *mochaenum* (Fig. 1, Table 1). Characters shared by the hybrid and its hypothesized parents include dimorphic fronds, the fertile fronds being longer than the sterile fronds, and fertile and sterile pinnae slightly angled towards the frond apex, with numerous bi- and tricellular hairs 250–450 µm long on their abaxial face. In addition, the sterile fronds of the three taxa have aphlebia, i.e., markedly reduced pinnae at the base of the lamina. The texture of the lamina is



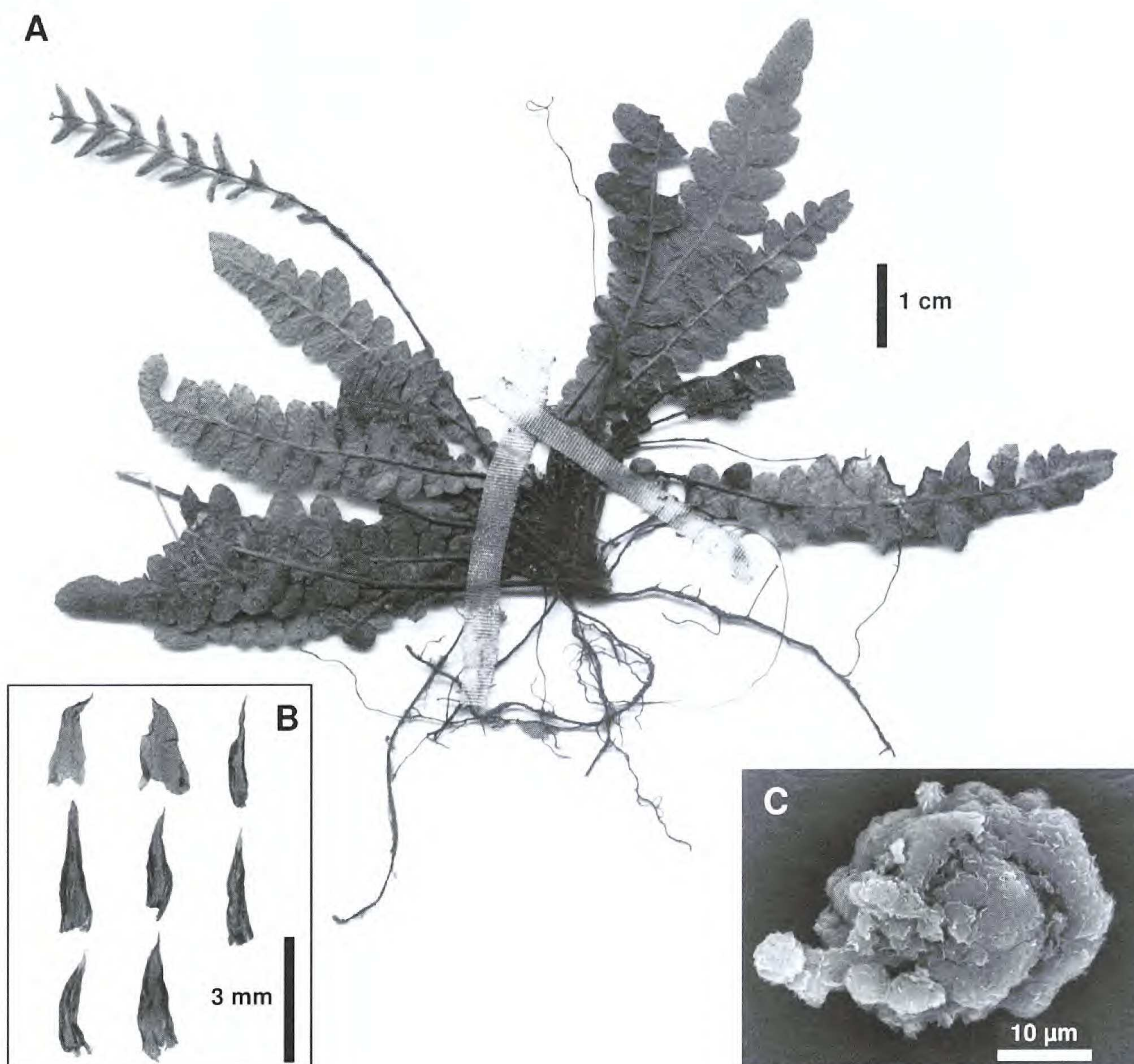


FIG. 1. Rodríguez's hybrid deer fern, *Blechnum*  $\times$  *rodriguezii*. A) type specimen (Amigo & Rudloff CL1956, SANT); B) petiole paleae (Amigo CL1978, SANT); C) scanning electron micrograph of spore (Amigo & Quintanilla LGQ582, SANT).

intermediate between that of *B. corralense* (herbaceous) and *B. mochaenum* subsp. *mochaenum* (coriaceous). Stoma length is likewise intermediate. However, some characters coincide with those in *B. corralense*: lengths of sterile and fertile fronds, number of pinnae per sterile frond, number of veins per sterile pinna, and size and shape of paleae. At several sites in the immediate vicinity of the hybrids, we have found *B. chilense* (Kaulf.) Mett. and *B. penna-marina* (Poir.) Kuhn, in addition to both hypothesized parents. *Blechnum chilense* is a giant deer fern with sterile fronds up to 150 cm long, morphologically very different from the hybrids. *Blechnum penna-marina* is more similar to the hybrids, but its sterile and fertile pinnae are oblong, perpendicular to the rachis, and subglabrous. This species, moreover, lacks aphlebia.



***Blechnum* × *rodriguezii*** Aguiar, Quintanilla & Amigo, **hyb. nov.** TYPE.—CHILE. Los Lagos Region, **Valdivia Province:** Valdivia National Reserve, El Peuco, in close association with both putative parents, 585 m, 26 Jan 2000, *Amigo & Rudloff CL1956* (holotype: SANT; isotype: CONC).

Planta hybrida, media inter parentes putatos, sed *Blechno corralensi* aliquid similior. Ab hoc distinguitur: lamina magis coriacea et stomata minora. Sporae abortivae.

Dedicated to Roberto Rodríguez, Concepción, who has added very considerably our knowledge of the Chilean ferns, especially of the genus *Blechnum*.

PARATYPES.—CHILE. Los Lagos Region, **Valdivia Province:** Oncol hill, Sendero Bonifacio, 530 m, 11 Feb 2000, *Amigo CL1978* (SANT); Cordillera Pelada, Chivería river, 555 m, 13 Feb 2001, *Amigo & Quintanilla LGQ582* (SANT); **Palena Province:** ascent to Hornopirén National Park, 150 m, 23 Jan 2001, *Amigo, Pajarón, Pangua & Quintanilla LGQ545* (SANT); ascent to Termas El Amarillo, 330 m, 26 Jan 2001, *Amigo, Pajarón, Pangua & Quintanilla LGQ548* (SANT).

In these locations, the vegetation consists of Valdivian rainforest dominated by evergreen trees (*Nothofagus nitida*, *Laureliopsis philippiana*, *Podocarpus nubigena*, *Amomyrtus luma*, *Saxegothaea conspicua*, *Weinmannia trichosperma*, *Drimys winteri*, etc.; Amigo *et al.*, 2004). *Blechnum* × *rodriguezii* appears most commonly on dripping soil banks and rock surfaces, on which it may be present at high density, possibly as a result of recurrent hybridization events and extensive clonal growth via stoloniferous axes (also present in *B. corralense* and *B. mochaenum* subsp. *mochaenum*). Given that both parents are endemic to southern Chile and Argentina, the potential area of distribution of this hybrid is limited.

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